

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

Applicant's or agent's file reference 23343.pct	FOR FURTHER ACTION See item 4 below	
International application No. PCT/US2004/028890	International filing date (<i>day/month/year</i>) 03 September 2004 (03.09.2004)	Priority date (<i>day/month/year</i>) 04 September 2003 (04.09.2003)
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237		
Applicant UNIVERSITY OF UTAH RESEARCH FOUNDATION		

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 bis.1(a).

2. This REPORT consists of a total of 9 sheets, including this cover sheet.

In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.

3. This report contains indications relating to the following items:

- | | |
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| <input checked="" type="checkbox"/> Box No. I | Basis of the report |
| <input type="checkbox"/> Box No. II | Priority |
| <input type="checkbox"/> Box No. III | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability |
| <input type="checkbox"/> Box No. IV | Lack of unity of invention |
| <input checked="" type="checkbox"/> Box No. V | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/> Box No. VI | Certain documents cited |
| <input checked="" type="checkbox"/> Box No. VII | Certain defects in the international application |
| <input checked="" type="checkbox"/> Box No. VIII | Certain observations on the international application |

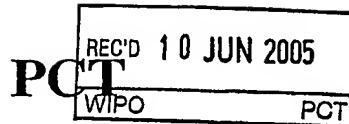
4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. +41 22 740 14 35	Date of issuance of this report 06 March 2006 (06.03.2006)
	Authorized officer Athina Nickitas-Etienne Telephone No. +41 22 338 89 95

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:
GARRON M. HOBSON
THORPE NORTH & WESTERN LLP
P.O. BOX 1219
SANDY, UT 84091-1219



WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing (day/month/year) 08 JUN 2005	
Applicant's or agent's file reference 23343.PCT	
FOR FURTHER ACTION See paragraph 2 below	
International application No. PCT/US04/28890	International filing date (day/month/year) 03 September 2004 (03.09.2004)
Priority date (day/month/year) 04 September 2003 (04.09.2003)	
International Patent Classification (IPC) or both national classification and IPC IPC(7): F01D 1/36 and US Cl.: 415/71, 80, 81, 90, 143	
Applicant UNIVERSITY OF UTAH RESEARCH FOUNDATION	

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/ US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 305-3230	Authorized officer Christopher Verdier Telephone No. (703) 308-0861
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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/US04/28890

Box No. I Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This opinion has been established on the basis of a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).

2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

a. type of material

☐ a sequence listing

☐ table(s) related to the sequence listing

b. format of material

☐ in written format

☐ in computer readable form

c. time of filing/furnishing

☐ contained in international application as filed.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
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Box No. V Reasoned statement under Rule 43 *bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims <u>10-12, 14, 16-17</u>	YES
	Claims <u>1-9, 13, 15</u>	NO
Inventive step (IS)	Claims <u>10-12, 16-17</u>	YES
	Claims <u>1-9, 13-15</u>	NO
Industrial applicability (IA)	Claims <u>1-17</u>	YES
	Claims <u>NONE</u>	NO

2. Citations and explanations:

Please See Continuation Sheet

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/US04/28890

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

The drawings are objected to under PCT Rule 66.2(a)(iii) as containing the following defect(s) in the form or content thereof: figure 1b does not show elements "48h" and "48i".

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Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the questions whether the claims are fully supported by the description, are made:

Claim 5 is objected to under PCT Rule 66.2(a)(v) as lacking clarity under PCT Article 6 because claim 5 is indefinite for the following reason(s): Claim 5, lines 12 and 13, which recite "interconnected to rotate together at the same speed" and "rotatable at different speeds", is incomplete and thus unclear.

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
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Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

V. 2. Citations and Explanations:

Claims 1-3, 7, and 15 lack novelty under PCT Article 33(2) as being anticipated by Mauron 1,586,160. Note the pump housing with inlet d, outlet e, unnumbered fluid passage, and means for both transferring rotational movement to the fluid by viscous forces and imparting centrifugal forces to the fluid, including a wiper c extending partially across at least one rotatable disc surface of a rotatable disc a, the disc surface including arcuate blades a' extending from the disc surface and oriented spirally, with the wiper having a position extending aside from an axis of rotation of the disc, motor h operatively coupled to the disc, and opposing wall p that opposes the wiper, with the wiper, opposing wall, and rotatable disc together defining at least a portion of the fluid passage.

Claims 1-3, 7, and 15 lack novelty under PCT Article 33(2) as being anticipated by Turner 3,535,051. Note the pump housing with inlet 14, outlet 6a, unnumbered fluid passage, and means for both transferring rotational movement to the fluid by viscous forces and imparting centrifugal forces to the fluid, including a wiper 7a, 8a extending partially across at least one rotatable disc surface of a rotatable disc 10, the disc surface including channels 22 extending into the disc surface and oriented radially with respect to an axis of rotation of the rotatable disc, with the wiper having a position extending aside from an axis of rotation of the disc, a motor operatively coupled to the disc, and opposing wall 6 that opposes the wiper, with the wiper, opposing wall, and rotatable disc together defining at least a portion of the fluid passage.

Claims 1-5, 7, and 15 lack novelty under PCT Article 33(2) as being anticipated by Caldwell 3,250,458. Note the pump housing with inlet 23, outlet 27, unnumbered fluid passage, and means for both transferring rotational movement to the fluid by viscous forces and imparting centrifugal forces to the fluid, including wipers 45, 47 extending partially across at least one rotatable disc surface of a rotatable disc 79, 81, the disc surface including ridges 87, 89 extending from the disc surface and oriented radially with respect to an axis of rotation of the rotatable disc, with the wipers having a leading and trailing edge extending across the disc a distance less than a radius of the rotatable disc surface, the leading edge and trailing edge having a curvature in a plane parallel with the rotatable disc surface, the leading and trailing edges having a convex curvature therebetween, with a position extending aside from an axis of rotation of the disc, the leading and trailing edge being perpendicular to the rotatable disc surface, a motor 29 operatively coupled to the disc, and opposing wall 67 that opposes the wiper, with the wiper, opposing wall, and rotatable disc together defining at least a portion of the fluid passage.

Claims 1-5, 7, and 15 lack novelty under PCT Article 33(2) as being anticipated by Mase 4,668,160. Note the pump housing with inlet 1A, outlet 1B, unnumbered fluid passage, and means for both transferring rotational movement to the fluid by viscous forces and imparting centrifugal forces to the fluid, including wipers 8, 5B extending partially across at least one rotatable disc surface of a rotatable disc 4A, 5A, the disc surface including ridges 7, 9 extending from the disc surface and oriented radially with respect to an axis of rotation of the rotatable disc, with the wipers having a leading and trailing edge extending across the disc a distance less than a radius of the rotatable disc surface, the leading edge and trailing edge having a curvature in a plane parallel with the rotatable disc surface, the leading and trailing edges having a convex curvature therebetween, with a position extending aside from an axis of rotation of the disc, the leading and trailing edge being perpendicular to the rotatable disc surface, a motor 6 operatively coupled to the disc, and an unnumbered opposing wall that opposes the wiper, with the wiper, opposing wall, and rotatable disc together defining at least a portion of the fluid passage.

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Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Claims 1-7 and 15 lack novelty under PCT Article 33(2) as being anticipated by Narita 4,732,529. Note the pump housing with inlet A, outlet B, unnumbered fluid passage, and means for both transferring rotational movement to the fluid by viscous forces and imparting centrifugal forces to the fluid, including wipers 3a, 3b extending partially across at least one rotatable disc surface of a rotatable disc 2a, 2b, the disc surface including ridges 2I extending from the disc surface and oriented radially with respect to an axis of rotation of the rotatable disc, with the wipers having a leading and trailing edge extending across the disc a distance less than a radius of the rotatable disc surface, with a position extending aside from an axis of rotation of the disc, the leading and trailing edge being perpendicular to the rotatable disc surface, a motor operatively coupled to the disc, and an unnumbered opposing wall that opposes the wiper, with the wiper, opposing wall, and rotatable disc together defining at least a portion of the fluid passage. The unnumbered inlet passage and unnumbered outlet passage are perpendicular to the disc surface.

Claims 1-3, 7, and 15 lack novelty under PCT Article 33(2) as being anticipated by Hartman 2,245,035. Note the pump housing with an inlet near 33, an outlet 53, unnumbered fluid passage, and means for both transferring rotational movement to the fluid by viscous forces and imparting centrifugal forces to the fluid, including a wiper 21 extending partially across at least one rotatable disc surface of a rotatable disc 41, the disc surface including arcuate blades 42 extending from the disc surface and oriented spirally, with the wiper having a position extending aside from an axis of rotation of the disc, motor 13 operatively coupled to the disc, and opposing wall 19 that opposes the wiper, with the wiper, opposing wall, and rotatable disc together defining at least a portion of the fluid passage.

Claims 1-3, 7, and 15 lack novelty under PCT Article 33(2) as being anticipated by Villard 4,242,039. Note the pump housing with an inlet near 11, an outlet 12, unnumbered fluid passage, and means for both transferring rotational movement to the fluid by viscous forces and imparting centrifugal forces to the fluid, including a wiper 13 extending partially across at least one rotatable disc surface of a rotatable disc 14, the disc surface including arcuate channels 40 extending into the disc surface, with the wiper having a channel 36, 38 extending into the wiper opposite the rotatable disc surface, and a position extending aside from an axis of rotation of the disc, motor 2 operatively coupled to the disc, and opposing wall 15 that opposes the wiper, with the wiper, opposing wall, and rotatable disc together defining at least a portion of the fluid passage.

Claims 1, 8-9, and 13 lack novelty under PCT Article 33(2) as being anticipated by Negishi 5,297,926 (figures 3, 6a, and 6b). Note the pump housing 5 with an unnumbered inlet, an outlet 6, unnumbered fluid passage, and means for both transferring rotational movement to the fluid by viscous forces and imparting centrifugal forces to the fluid, including a rotatable shaft 9 with a hollow cavity extending from one end to at least one unnumbered slot extending radially from the hollow cavity, with the hollow cavity of the shaft having a straight, constant diameter bore oriented concentric with an axis of rotation of the shaft, with plural slots laterally adjacent one another and disposed circumferentially around the shaft, and volute 5 disposed around the shaft at the at least one slot.

Claims 1 and 8-9 lack novelty under PCT Article 33(2) as being anticipated by Kardas 4,452,566. Note the pump housing 10 with an inlet 16, an outlet 48, unnumbered fluid passage, and means for both transferring rotational movement to the fluid by viscous forces and imparting centrifugal forces to the fluid, including a rotatable shaft 44 with a hollow cavity extending from one end to at least one slot near 36 extending radially from the hollow cavity, with the hollow cavity of the shaft having a straight, constant diameter bore oriented concentric with an axis of rotation of the shaft, with plural slots laterally adjacent one another and disposed circumferentially around the shaft.

Claim 14 lacks an inventive step under PCT Article 33(3) as being obvious over Negishi 5,297,926. Negishi discloses a pump device substantially as claimed as set forth above, including a motor M coupled to the shaft, with an intermediate member 5 defining a volute around the shaft at the at least one slot, but does not disclose a pair of bearings carrying the shaft and disposed on opposite sides of the at least one slot.

Pumps with bearings that support a shaft and are located such that the bearings are on opposed sides of an impeller of the shaft and thus on opposed sides of the shaft are conventional and well-known, for the purpose of rotatably supporting the shaft.

It would have been obvious to form the pump of Negishi such that it includes a pair of bearings carrying the shaft and disposed on opposite sides of the at least one slot, for the purpose of rotatably supporting the shaft.

Claims 10-11 meet the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest the improvement to a rotatable shaft with a hollow cavity extending from one end to at least one slot near extending radially from the hollow cavity, the improvement comprising a portion of the shaft laterally adjacent to the slot defining at least one impeller blade formed within a circumference of the shaft.

Claim 12 meets the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest the improvement to a rotatable shaft with a hollow cavity extending from one end to at least one slot near extending radially from the hollow cavity, the improvement comprising an end surface of the hollow cavity proximate the at least one slot having a protrusion to guide flow to the at least one slot.

**WRITTEN OPINION OF THE
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International application No.
PCT/US04/28890

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Claims 16-17 meet the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest the improvement to a rotatable shaft with a hollow cavity formed in the shaft, having plural slots formed in the shaft and extending from an outer surface of the shaft to the hollow cavity, the improvement comprising a plurality of impeller blades between the plurality of slots and within a circumference of the shaft.

Claims 1-17 meet the criteria set out in PCT Article 33(4), and thus have industrial applicability because the subject matter claimed can be made or used in industry.